

Stars of the sea, beach balls and warty sausages!

ECHINODERMS are a group of marine invertebrates (animals without an internal backbone).

Many echinoderms have a hard outer casing, called an exoskeleton, to protect their soft bodies.

Sea stars, sea urchins, sea cucumbers and **sand dollars** are all examples of echinoderms. These animals generally have spiny skin – that’s what echinoderm means (from Greek echinos, “spiny,” and derma, “skin”).

Which ones have you found at the beach?



Sea Star



Sea Urchin



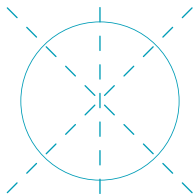
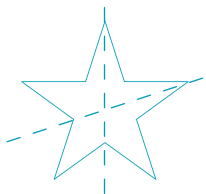
Sand Dollar

Since echinoderms are only found in marine environments, they all use water to help with their body functions such as movement, respiration and the transport of nutrients around their bodies.

Adult echinoderms have a special sort of symmetry called **radial symmetry**. This means that cutting an imaginary line through the centre of the animal, in almost any direction, produces two halves that are mirror images of each other.

ACTIVITY 1. Explore radial symmetry

Add an extra dashed line of radial symmetry to this star and circle below:



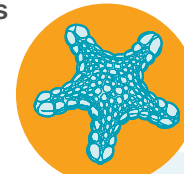
ACTIVITY 2. Create your own echinoderms

MATERIALS: • Playdough • Star-shaped cookie cutter (or plastic cutting tool) • a pencil

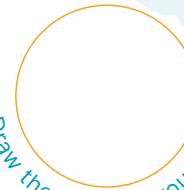
i. MAKE A SEA STAR then draw it

Flatten your playdough and cut out a star shape. You have just made a **sea star**!

- How many “arms” does your sea star have?
- How many ways could this star shape be cut to make two halves that are mirror images of each other?



i. Sea Star



Draw the Sea Star you made

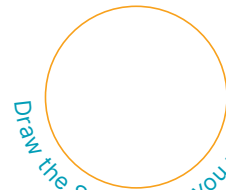
ii. MAKE A SEA URCHIN then draw it

Carefully curl and fold each of the “arms” of your sea star in toward the middle of the star shape. You have just made a **beach ball**!

- Gently smooth out the playdough to remove any gaps between the “arms”. You now have the “test” of a **sea urchin**.
- The test is the skeleton of a sea urchin that washes up on the beach, usually the spines have fallen off.
- How many ways could this sea urchin be cut to make two halves that are mirror image of each other?



ii. Sea Urchin



Draw the Sea Urchin you made

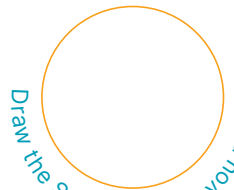
iii. MAKE A SEA CUCUMBER then draw it

Can you gently stretch your beach ball shape into a hollow sausage shape without breaking it?

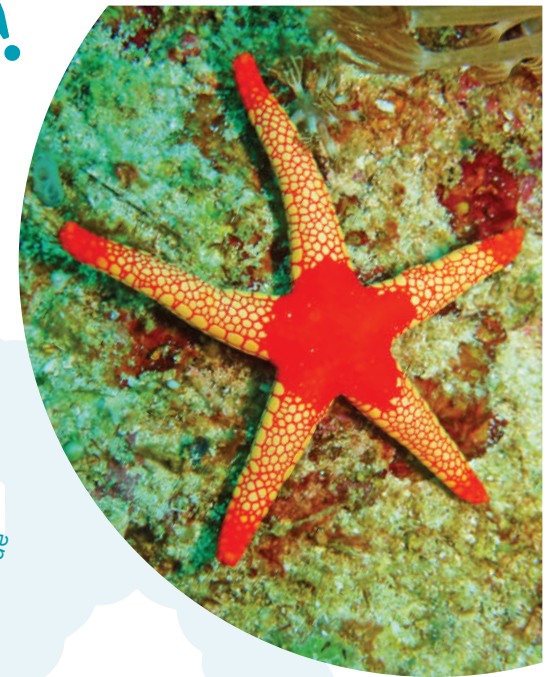
- Start stretching from the end where the arms of the sea star came together. You have just made a **sea cucumber**!
- Looking down one end of the sea cucumber, try to imagine how many ways it could be cut to make two halves that are mirror images of each other.



iii. Sea Cucumber



Draw the Sea Cucumber you made



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